

Relationship between Biofilm and Water Column PCBs

SRRTTF Data Synthesis
Workshop

May 30, 2019

Objective

- Examine ratio of PCB concentrations in biofilm and water column at different locations
- Potential Outcomes
 - Identification of localized sources
 - e.g. Groundwater PCB sources not fully mixed in the water column
 - Assessment of overall variability
 - And need for additional data

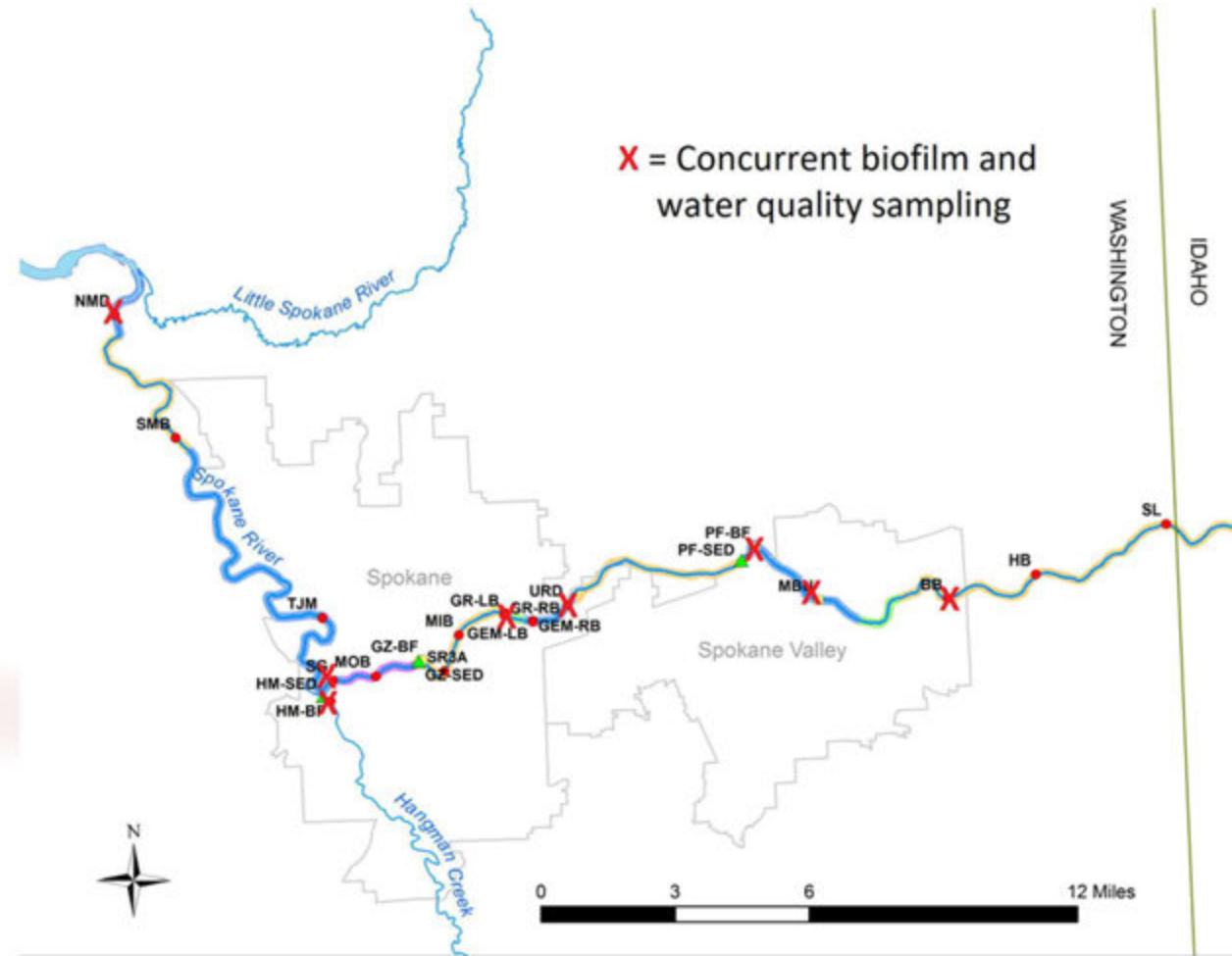
Approach

- Pair August 2018 synoptic water column data with concurrent biofilm stations
- Calculate ratio of $\text{PCB}_{\text{biofilm}}:\text{PCB}_{\text{water}}$ aka “bioconcentration” factor
- Examine spatial differences, overall variability

Available Data

- Eight locations of concurrent biofilm and water column data

- Nine Mile
- Hangman Ck.
- USGS Gage
- Greene St.
- Upriver Dam
- Plante's Ferry
- Mirabeau
- Barker Rd.

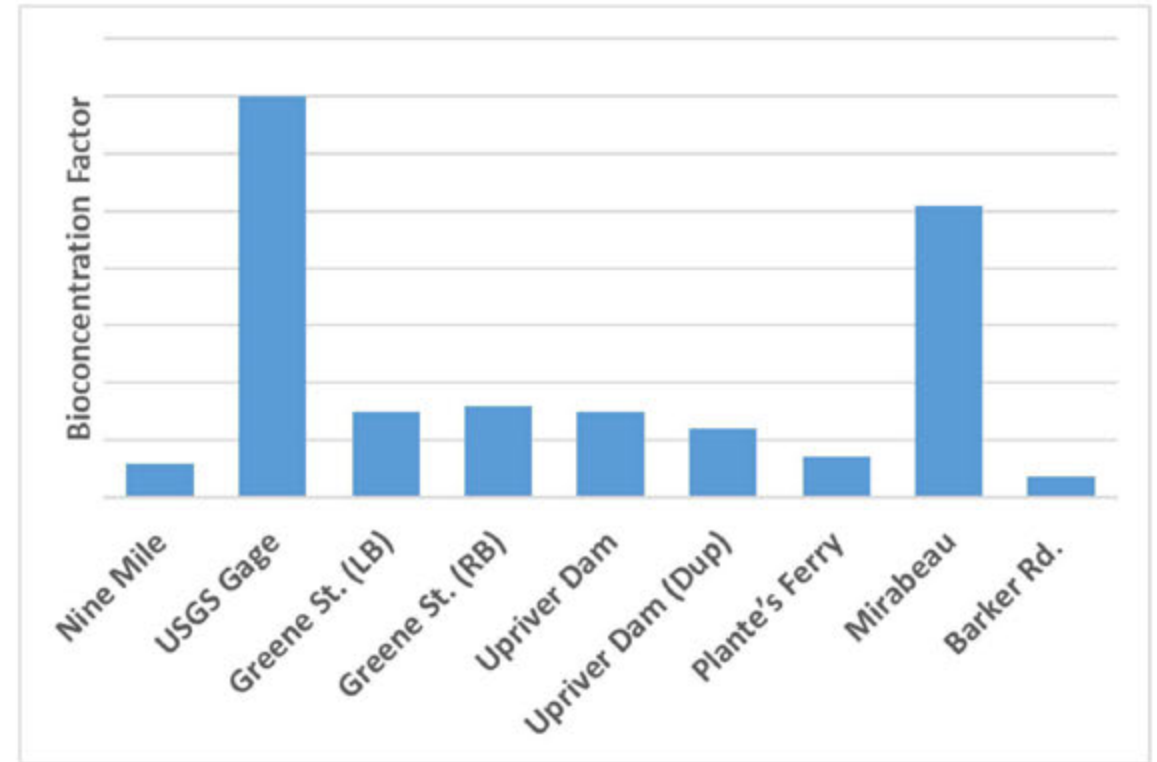


Biofilm Bioconcentration Results

	Biofilm PCB (pg/g)	Water Column PCB (pg/l)	BCF (l/g)
Nine Mile	568	92	6
USGS Gage	5762	81	70
Greene St. (LB)	1057	69	15
Greene St. (RB)	1070	69	16
Upriver Dam	1410	94	15
Upriver Dam (Dup)	1107	94	12
Plante's Ferry	618	89	7
Mirabeau	392	8	51
Barker Rd.	95	25	3.8

Biofilm Bioconcentration Results

- Two stations stand out
 - USGS Gage
 - Very high biofilm concentration
 - Mirabeau
 - Lower biofilm concentration, but very high relative to water column concentration



Variability in Biofilm Concentration

- How much stock can we put into a single sampling event?
 - Examine between-station variation from 2018 Spokane sampling
 - Examine within-station seasonal variation from Wenatchee

Variability in Biofilm Concentration

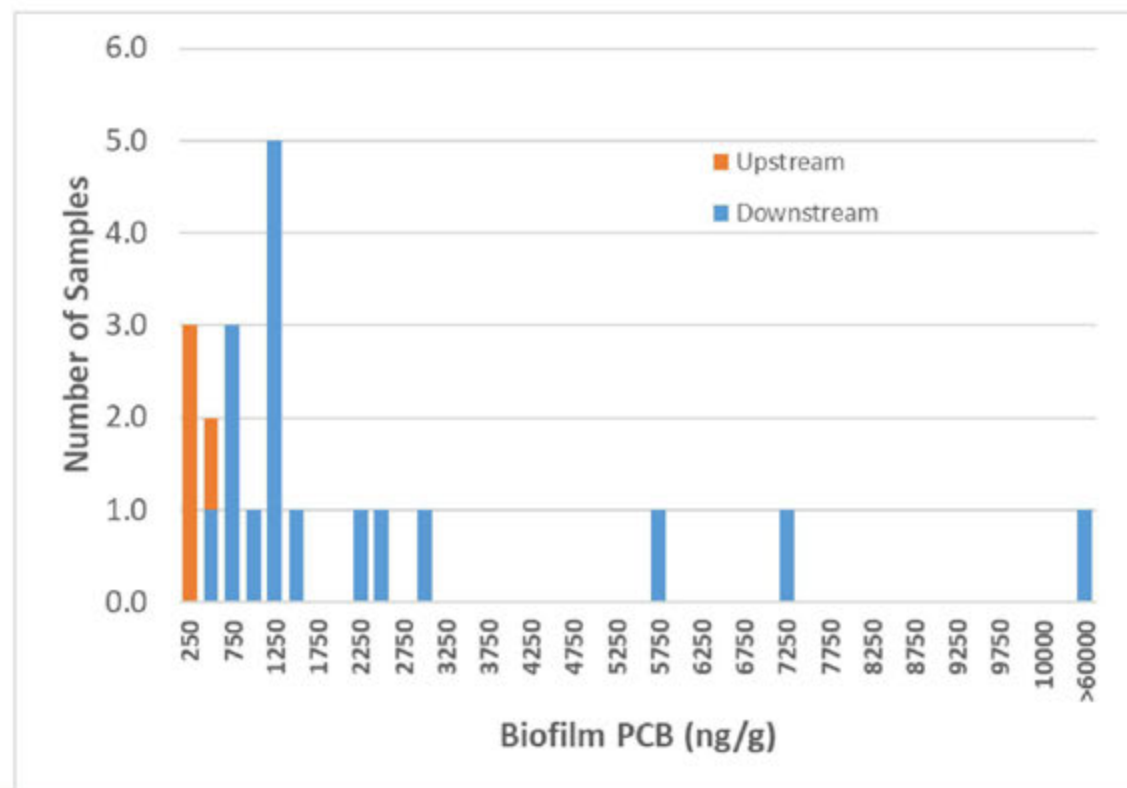
- Between-station variation is very high

- Including SR-3A sample

- Average: 39,000
- Standard deviation: 150,000
- Coefficient of variation: 3.9

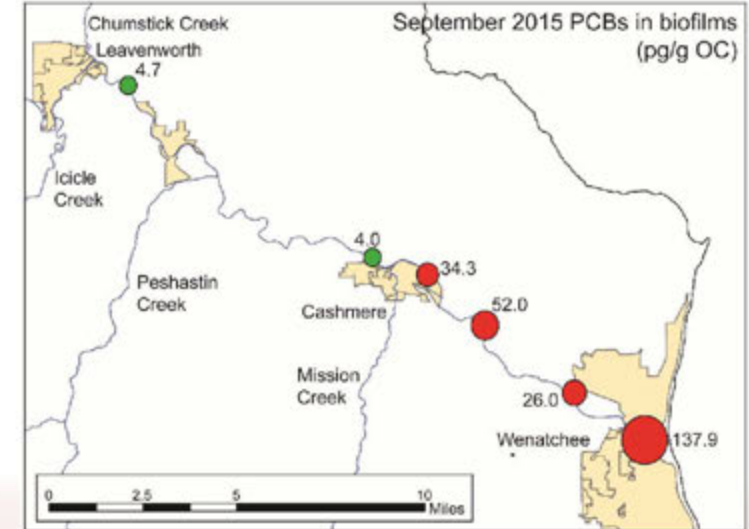
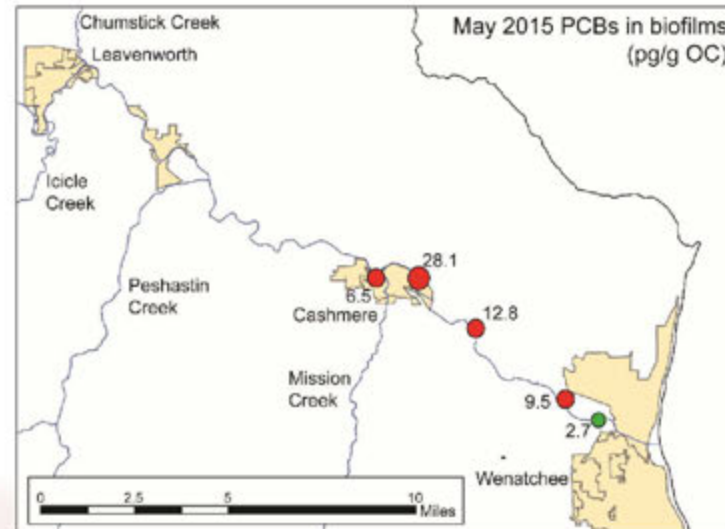
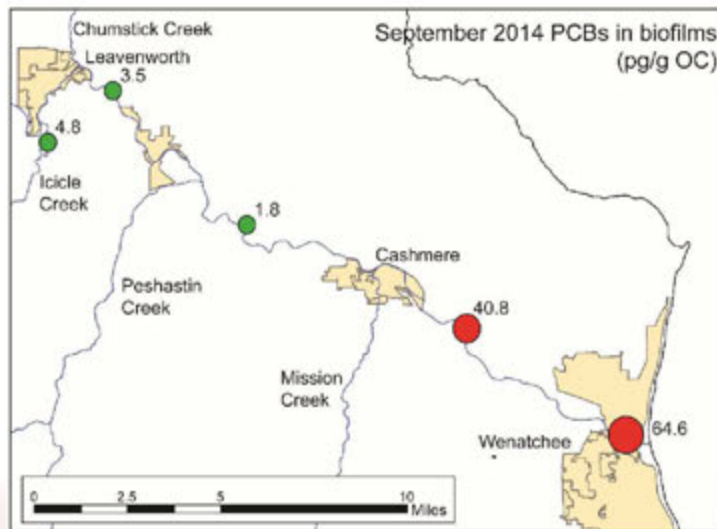
- Excluding SR-3A sample

- Average: 1900
- Standard deviation: 1900
- Coefficient of variation: 1.0



Variability in Biofilm Concentration

- Within-station seasonal variation from Wenatchee
 - Biofilm PCB concentrations can vary significantly over time



Biofilm Correlation: Conclusions

- There is a lot of variability in biofilm PCB concentrations
 - This is not unexpected
 - Too few data to draw strong conclusion
 - Localized source near Mirabeau?
- Will additional monitoring help?
 - If we want to make any strong conclusions based on biofilms, yes

Discussion